probably will be negligible and certainly will not be great enough to bring on a business recession.

At the time McGraw-Hill interviewed top executives, some companies had not yet approved their 1948 capital budgets. Under the extreme assumption that those particular companies will make no capital expenditures in 1948, industry's 1948 bill for new plants and equipment will run to $14.9 billion, or 8% below last year's record figure. Under the more realistic assumption that those companies will cut their capital investment only as much as the companies which had already drawn up their plans for 1948, industry's 1948 capital budget will run to almost $15.8 billion, a decline of only $300 million from 1947.

Thus the over-all conclusion of the McGraw-Hill survey is that capital expenditures by business will be only slightly lower this year than last.

3. Business executives will not slash their 1948 capital budgets unless they are convinced that a real slump is in the offing—and they are not convinced now.

Almost two-thirds of all manufacturing companies say they would not cut capital budgets sharply even if business activity declined 20%. What is more, even a 15-20% boost in wage rates would have little effect on projected capital budgets. If wages go up, 57% of manufacturing companies would not change their capital budgets, 26% would increase them, and 17% would cut them.

4. Most executives look for an increase in their company's sales this year.

More than half of all manufacturing companies are planning on a sales increase over last year of 10% or more. A third of them say sales will be about the same as in 1947. And fewer than 10% look for lower sales.

5. Manufacturing companies will finance much of their purchases of new plants and equipment in 1948 from funds set aside out of past or current earnings.

Utilities and railroads, on the other hand, must go to the securities markets or commercial banks to finance most capital expenditures.

Although manufacturing companies say they can finance this year's capital expenditures in large part from current profits and past savings, all evidence indicates that, to do so, they will use up most of the funds they earmarked during the war for this purpose. So in 1949, industry must go to the capital markets or to the commercial banks if it is to continue to spend for capital purposes. If the securities markets continue to lie in the doldrums, *as they will under present tax laws*, only companies with triple A credit ratings will be able to raise funds that way.

6. Purchases of new plants and equipment may fall off in 1949.

The McGraw-Hill survey collected all available evidence on plans for 1949 capital budgets. Fewer than 40% of all manufacturing companies now have definite plans for 1949. Of those that have plans, 45% intend to spend less than in 1948, 30% plan to spend the same amount, and a quarter expect to spend more. These preliminary decisions would seem to indicate that capital investment may fall off in 1949.

7. Industry's production capacity in 1949 will be far above prewar.

Manufacturing capacity will be more than 50% greater than in 1939 once the present wave of postwar building is complete. Almost a third of all manufacturing companies report that their capacity will be double or more than double the prewar figure. Thus 1949 may see a huge increase in production of many things that now are hard to buy.

The last two points in this summary mean that 1949 will be a critical year. We must forestall a sudden drying up of capital expenditures in that year. We must be able also to absorb a great outpouring of production both of capital and consumer goods.

What will happen to business in 1949, therefore, will depend on how successful we are *this year* in dealing with such momentous problems as taxation, foreign aid and prices. But 1949 can be a good year too.

The next editorial in this series will discuss the pivotal problem of taxes.

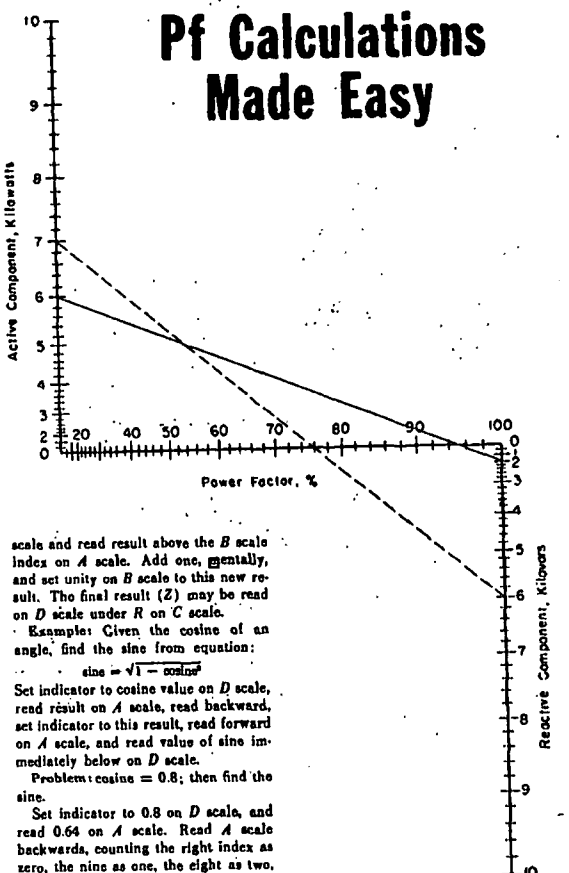
James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

THIS IS THE SIXTH OF A SERIES

Pf Calculations Made Easy

There are many ways to solve power-factor problems. Here's how G Oldroyd, of Birmingham, England, makes simple slide-rule calculations. His handy pf nomogram will fill a useful place in any power plant



▶ The article "Homemade Calculator Gives Power Factor," p 103, October 1946 POWER, makes rather heavy going of a comparatively simple operation. Power-factor values can easily be obtained from kilowatt and kilovar readings, using an ordinary slide rule. The solution is self-contained and does not require trigonometric tables.

On the slide rule, set kilowatts on C scale above kilovars on D scale, and read the result on A scale opposite the index on B scale. To this value add one, mentally. Move the index on B scale to this new result on A scale. Power factor may now be read on C scale opposite the index on D scale.

Taking the example in the article, set 20,000 kilovars on D scale against 60,000 kilowatts on C scale, and read 0.111 on A scale, above the right-hand index of B scale. Adding one to this result, set the left-hand index of B scale to 1.111 on A scale, and read 95% on C scale above the right-hand index on D scale.

Many other vector problems can be solved in a similar manner on a slide rule. The following may be of interest:

Example: Square root of the sum of the squares:

$$Z = \sqrt{X^2 + R^2}.$$

Rearrange in the form:

$$Z = R\sqrt{\left(\frac{X}{R}\right)^2 + 1}$$

Set (X) on D scale, opposite (R) on C scale and read result above the B scale index on A scale. Add one, mentally, and set unity on B scale to this new result. The final result (Z) may be read on D scale under R on C scale.

Example: Given the cosine of an angle, find the sine from equation:

$$\text{sine} = \sqrt{1 - \text{cosine}^2}$$

Set indicator to cosine value on D scale, read result on A scale, read backward, set indicator to this result, read forward on A scale, and read value of sine immediately below on D scale.

Problem: cosine = 0.8; then find the sine.

Set indicator to 0.8 on D scale, and read 0.64 on A scale. Read A scale backwards, counting the right index as zero, the nine as one, the eight as two, and so on; the figure 0.64 reads as 0.36. Setting indicator to 0.36 on A scale, read 0.6 on D scale immediately below.

If unskilled personnel have to carry out these calculations the nomogram in the diagram quickly determines power factor from readings of kilowatts and kilovars.

When calibrated over suitable ranges and with a straight edge placed across known values of active and reactive components this nomogram gives the power factor on the horizontal center scale. As long as the ratio kvar/kw remains unaltered, for any particular values of kw and kvar, or mw and mvar scale values, the kw and kvar values can be adjusted by multiplying by the same constant factor. For example, 6 mw on the chart can be multiplied by 10 and read as 60 mw; similarly 2 mvar is read as 20 mvar. The power factor of 0.95 is indicated on the horizontal cosine scale, which, of course, requires no modification. This is the same example as the one in Oct 1946, POWER.